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PIERRE, THE PARISIAN SHOEBLACK.

PIERRE, the hero of our story, was a Paris *gamin*—one of that nomadic tribe of urchins who wander over the French metropolis—ragged, hilarious, too often addicted to pilfering, owing to vicious example on the part of their elders, and perhaps their parents; bold and daring in the midst of the *émeutes*, political strifes, and convulsions, of which the French capital has been so frequently the sanguinary theatre; rushing forth in crowds,

leaping and shouting behind barricades, and amidst the roar of cannon and musketry; and if they can obtain possession of a pistol, or a carbine, firing it with true Parisian recklessness, with perhaps deadly aim, at a soldier or a *gendarme*, merely for what they call the fun of the thing, and to encourage the others; and then, when the bloody strife is over, dispersing and vanishing like Arabs in the desert.

These poor children are greatly to be pitied. For the most part they see and hear nothing from their earliest years but vice, and the most frightful and blasphemous language; their faults and their crimes arise more from these melancholy causes than from any peculiar predisposition to evil; while there are many instances of their having emancipated themselves from the thraldom of their degraded position, and become valuable members of society. Neglect and bad example are the chief causes of the faults of these *gamins;* just as is the case with regard to our own ragged-school children—a branch of the same family of unfortunates.

Pierre was a light-hearted but not a light-fingered *gamin;* he had never pilfered, nor had he any tendency towards so disgraceful a practice, though he was surrounded by other *gamins*, most of whom considered pilfering to be, not only a harmless, but a justifiable occupation. Pierre was full of fun, however, though he but too often performed his pranks when his stomach was empty. At the time we are speaking of he was about eight years of age; his father had been dead three years; he was a man of good character, and had worked hard at his calling, that of a journeyman mason, until his decease, after a lingering illness, which had been brought on by over-exertion and taking cold. His widow was left destitute, owing to the long illness of her husband and the cessation of his earnings during its continuance; and the only method she had of supporting herself and her little son—then but five years old—was to go out to wash as a journeywoman, which she did for a pittance barely sufficient to pay the rent of a small room on the sixth story of an old house in the faubourg St. Martin, and to provide a very scanty subsistence.

On Saturday nights the poor and industrious widow went to market to buy the ingredients for her economical mess, which simmered before the scanty wood-fire on the hearth all the forenoon of Sunday. On that day of rest she sat down contentedly with her little son to this frugal meal of soup and *bouilli*, the remains of which lasted three or four days, warmed up; or, after all the soup was gone, the meat was eaten cold, with a little vinegar, and perhaps some cold potatoes, cut into slices and dressed as a salad. On week-days the mother came home for an hour at dinner-time, and then returned to her washing. Little Pierre went to the gratuitous parish-school, where he learned to read and write, after a fashion; but the discipline was not strict, and if he stayed away a half, or even a whole day—as he frequently did—a slight observation only was made by the schoolmaster, who had so many gratuitous *gamins* in his school.

The poor widow, however, became very anxious about her son as he grew older; and she especially dreaded the continuance of his association with the *gamins*, and of his being so much at liberty to do as he pleased during her unavoidable daily absence; yet, though she turned the matter over and over continually in her mind, she still felt completely at a loss what to do to keep little Pierre out of the reach of mischief. She tried to get him a place as an errand-boy, or something of that kind, but was unsuccessful.

At length, after one of the restless, anxious nights which she but too often passed, the thought came into her head all at once, that Pierre might set up for himself as a little *décrotteur*, or boot and shoe cleaner. These *petits décrotteurs* were, and still are, to be seen in every quarter of Paris, at the corners of busy streets, near the theatres and other places of public amusement, the reading-rooms, the galleries of art and science, and other national establishments which are gratuitously thrown open to the public; at the gates of the public gardens, such as those of the Tuileries, the Luxembourg, &c. &c.; at the different entrances of the Palais-Royal, and, at that time, even in some of the passages of that celebrated and unique bazaar and promenade. At the period we are writing of, the two old parallel Galeries de Bois, or wooden galleries, existed; they were afterwards demolished, and replaced by the present two beautiful parallel galleries with their richly-sculptured arched roofs, bordered by elegant shops, *cafés*, *restaurants*, and, to crown all, with the magnificent glass-roofed Galerie d'Orléans. The old wooden galleries were improved, and a large proportion of the confined shops on either side of them were for the sale of showy bonnets, and other gay articles of the female toilette—not of the first fashion. It was a sort of Parisian Cranbourne-alley. These shops were let, however, at very high rents, and the wooden galleries were more crowded with loungers than the other longer and more elegant stone and paved galleries; especially was this the case during the winter evenings, as they were much warmer than the stone arcades. Two or three little *décrotteurs* had already established themselves in the wooden galleries.

Pierre was a good-tempered and conformable boy, and devotedly attached to his mother; so that when she asked him whether he would like to be a *petit décrotteur*, or little shoeblack, he directly replied: "I should like it much, dear mother, if you wish it."

His mother tenderly embraced him, and set about considering how she should manage to establish Pierre in his little business. In the meantime she told him to look about during her absences, and observe how the *décrotteurs* did their work; what they received for brushing, blacking, and polishing their customers' boots and shoes; what brushes they made use of, and so forth. Moreover, she recommended him to examine the different districts of the metropolis, and try to hit upon a spot where there would be a chance of his obtaining work without being elbowed out by too many competitors. Pierre was delighted at the idea of setting up in a little business for himself. He formed many projects as to his arrangements, the object of all of them being to earn and save money for his dear mother, and to endeavour to

procure her some relief from the severe labour which she so constantly and so patiently performed, in order to insure a subsistence for him.

So he went daily into some fresh neighbourhood, observing the little *décrotteurs*. When he saw a good-natured face amongst them, he would now and then ask questions about their calling: in short, he gathered all the information he could. But he discovered that the ground was fully occupied in every desirable situation. Nevertheless, his mother got a carpenter to make a box, about two feet long and one in depth and height, and open at one side to contain blacking and brushes; then, one by one, she bought the three needful brushes, and having recollected a recipe which her late husband had for making blacking of a very superior quality, though at a much less cost than the common blacking, she obtained the ingredients, in small quantities, and at night, after returning from her washing, she perfected the sable compound, by simmering it for a given time in an earthen pot and then letting it gradually cool. The stock in trade was now complete, and there was hearty goodwill on the part of its owner to employ it to the best advantage.

It was on a Saturday evening that the first blacking brewing was perfected. On that evening, Pierre, unperceived by his mother, got her Sunday shoes, which were made of stout leather, and taking them down to the court-yard, with his apparatus, began his first operation as a *décrotteur*. How he did rub, and black, and shine those precious shoes! When they were so brilliant that you could almost see your face in them, he rushed up the six flights of steep, narrow, dark, stone stairs, in less than a minute, darted into their little room, and, holding up the shoes, cried:—

"Look here, mother! I was resolved that *yours* should be the first pair of shoes I would shine with your own blacking. See how smart they are! May little Pierre brush and shine your shoes for many years, dearest mother! He'll always try to do them better than those of anybody else!"

The poor woman's eyes filled with tears—tears of delight, at this mark of her little son's filial affection. She praised his work, folded him in her arms, and pressed him to her swelling heart. After a time she said: "Now make your own shoes look as brightly as your dear mother's, Pierre." Which he promptly did.

Sunday—such, alas! as Sunday is in Paris—was passed quietly by the mother and son. The former, however, was rather out of spirits, and Pierre saw that she was anxious lest all her arduous preparations should prove valueless. But before he went out on his tour of observation on Monday morning, Pierre said, with his cheerful boy's ringing voice:—

"*Ma mère*, I shall find a good spot to-day, to a certainty. Keep up your spirits, dear mother; all will be right."

Pierre went forth, not knowing whither to bend his steps, and, truth to tell, almost as sad as his mother; but the noble little fellow kept all this to himself. He wandered towards the Place du Palais Royal, where there was usually an assemblage of some half-a-dozen little *décrotteurs*, with whom Pierre had formed a gossiping acquaintance; indeed he had several times told them that he should like to be a *décrotteur*, and that his mother was trying to get together the required implements for following that occupation, should an opening occur. Pierre was too honourable to think of thrusting himself forward as a rival to those boys who, he saw, were already almost too numerous to make a scanty living by their industry.

It was at about the hour when the clerks and *employés* in the public offices and houses of business were on their way to apply themselves to their various occupations, that Pierre arrived at the Place du Palais Royal, in an almost hopeless mood. The group of *décrotteurs* were there, excepting one little fellow; and they welcomed Pierre cordially.

"Where is Antoine?" said Pierre.

"*Il est parti*," cried the boys, all together.

"Gone! Whither?"

"His aunt, who keeps the fried fish and fried potato shop at the corner of the Rue des Goujons, has been obliged to discharge the *gamin* who used to assist her in keeping up the fire of her furnace, and other matters, and she has sent for Antoine to supply his place. As he is an active, willing little fellow, he'll be of great use to his aunt, and get lots of fried potatoes every day for breakfast, dinner, and supper, and a bit of fried fish now and then into the bargain. He'll be better off than us poor *décrotteurs*, and we are all pleased at his good fortune."

"So am I," said Pierre.

It was a muddy day; moreover, there were more passengers than usual crossing the Place; so that there was quite a run upon the *décrotteurs*, and, diminished as their number was by Antoine's promotion as assistant to his aunt, it was difficult to attend with due speed to the awaiting customers. Pierre's hands itched to be brushing and shining away, like his friends the *décrotteurs;* but he had not brought his little stock in trade with him. Presently, one of the boys who had just finished clearing away the crust of mud from a gentleman's boots, threw his hard brush to Pierre, and said, briskly and good-naturedly:—

"Come, Pierre, kneel down on one knee, and brush that gentleman close to you, who is waiting."

No sooner said than done; the gentleman was evidently in haste, and glad to have the cleaning of his boots accelerated. For want of the box for the foot to rest upon, Pierre told him to place it on his (Pierre's) knee, and he began brushing away with right goodwill. By the time that he had rubbed the mud off both boots, the lad who had thrown him the hard brush had finished blacking and polishing those of his customer; another arrived, and the boy took back the hard brush from Pierre, telling him to make use of his blacking and shining brushes, and finish off the gentleman's boots, whilst he rubbed the mud from those of his fresh customer. Pierre completed his work rapidly and successfully. The gentleman offered him two sous in payment; but Pierre said they belonged to the other boy, whom he had gladly assisted for the sake of good-fellowship. The gentleman then handed the money to the regular *décrotteur*, who at first declined taking

it, saying it was due to Pierre. However, he at last took the two sous, saying that he would arrange with Pierre by and by.

The bustle of the muddy morning passed away in due time, and the group of *décrotteurs* assembled around Pierre, jesting, good-naturedly, about his sudden commencement as an assistant *décrotteur*, and unanimously inviting him to occupy Antoine's place, and take his chance as an independent member of their fraternity. Pierre was delighted; he hastened to the distant quarter where his mother was employed at her washing, embraced her, with tears of joy in his eyes, and told her what had happened; then, with his mother's blessing, he ran to their humble lodging, took his new box, blacking, and brushes, and returned to the Place du Palais Royal a little before the time when the Parisians are in the habit of repairing to the numerous *restaurants* and *cafés*, to dine or take refreshments. This is another busy portion of the *décrotteur's* day.

The *décroutteurs* admired Pierre's new box and its appurtenances.

"The box will soon be as dark-coloured as ours," said the good-natured little fellow who had lent him the hard brush in the morning; "and I wish it may bring you good luck. Come, we'll divide between us the two sous the gentleman gave us this morning; you *must* have one of them; it was well-earned, and will be a good beginning."

Pierre could not resist this kindly offer; he took the sou, and resolved to keep it, if possible, as the first money he had ever earned.

Soon the passengers thronged rapidly across the Place. Now and then one of them stopped to have his shoes or boots cleaned. Pierre did not press his own services; he wished to see all his good-natured companions employed before himself. At last, when they were all brushing and shining with all their might, a gentleman came up to Pierre, put one foot on the usual place on the top of the box, and the little fellow set to work. Before he had completed his task, two or three of the other boys were again at leisure, and stood looking on, as Pierre was putting the last polish on the boots. But *what* a polish! The youngsters were astonished! the gentleman delighted! When he was gone, the other boys asked Pierre where he bought his blacking.

"My mother made it," said Pierre.

"What beautiful *cirage!*" cried all the boys.

"Do you know how it is made?"

"Yes; but my mother made me promise that I would not tell any one. My poor father had a valuable receipt for making superior blacking, and my mother has preserved it. This blacking is not only excellent, as you have seen, but it is cheap."

Notes were compared as to the cost of the blacking used by the other *décrotteurs* and that made by Pierre's mother, and it was found that the latter was much the cheaper of the two.

More customers arrived in the course of the evening, and Pierre returned home in buoyant spirits, with ten sous in his pocket. He gaily handed the money to his mother. The poor widow's mind was now completely relieved: her dear son had employment; and there was now little risk of his being contaminated by idle or dissolute *gamins*.

Pierre was early at his post the next morning, and in due time had several customers. All their boots and shoes shone with unwonted lustre after his brushing, and blacking, and polishing; and the other boys seemed quite ashamed of the inferior effects of their blacking. On every successive day the same customers returned to Pierre, with others recommended by them, so that he had his hands more than full; for many gentlemen preferred to wait ten minutes, in order to take their turn, because Pierre's blacking, and his manner of using it, outshone the efforts of his brother *décrotteurs*, some of whom stood by unoccupied, and with despondent looks, whilst Pierre was working away with the alacrity inspired by his brilliant success.

Pierre's generous heart was pained at seeing his companions so cast down; he felt that he had been most kindly and liberally admitted into the confraternity; and he would have abandoned at once all his opening prospects, rather than be the cause of damaging them in their industrious career. He felt the more keenly on this point, because his companions, instead of showing any symptoms of jealousy, only looked sad, and occasionally expressed an earnest wish that they could make or procure such good blacking as Pierre's. All these thoughts, which were constantly passing through his mind, he imparted to his mother, who was charmed not only with her son's success, but with his ingenuous and noble disposition.

One night Pierre said to his mother: "I have been thinking that we might render a service to my brother *décrotteurs*, and benefit ourselves also. The inferior blacking they use costs them one third more than ours: I do not like to continue to possess an advantage over them which no efforts of theirs can surmount, and which is evidently discouraging them. If we could manufacture our blacking in larger quantities, we could sell it to them for something less than they now pay for their own inferior compound; we should get a profit, and they would be upon an equality with me as to the material for carrying on our business, and they would make a little saving in their outlay; there would then be a fair competition amongst us for customers; each would depend upon his own diligence and obligingness, and my profits would be greater only from having my blacking at prime cost; but its quality would be the same with us all."

The mother reflected for a while. In order to make the larger quantity of blacking, she must limit her washing occupation to half instead of a whole day, once or twice a week; still the idea was a good one; and if she could manage to purchase her ingredients in larger quantities, and from wholesale dealers, they would cost much less, and the profit would be increased. So she consented to make the trial.

On the following morning Pierre went to his post with a light heart, and a particularly cheerful countenance.

"My *braves garçons*," he said to the little group whom he called around him, "I don't like to have an advantage over you as to blacking. I know you feel discouraged; I cannot tell you the secret, but I have persuaded my mother to consent to make a larger quantity of blacking than I want,

exactly of the same quality, and to sell it to you at much less than you now pay for yours: thus we shall all be alike, and he who brushes and polishes the best and the quickest will, no doubt, have the most customers: but there is full work for us all. Will this proposal suit you, my lads?"

"Yes, yes," they all joyfully cried at once; "*Vive le brave Pierre!* thank you, thank you!"

A happier set of little fellows could scarcely be seen anywhere. It was agreed that early in the morning of the next day but one, the boys should call at Pierre's dwelling, where a due supply of blacking should be ready for them. Of course Pierre helped his mother to make it. At the appointed time the lads brought their blacking pots, received their required measure, and paid Pierre's mother for it: she knew them all, from her son's oft-repeated description, and had a kind and appropriate word for each. The little regiment of *décrotteurs* then gaily marched to their post with Pierre at their head; and all had a full and satisfactory day's work. The blacking was excellent, and Pierre's eyes sparkled with true delight as he heard it praised by every customer.

We will not enter into the minutiæ of Pierre's successful progress, the result of cheerful industry, well-regulated generosity, and high principle. Suffice it to say, that from the day of his liberal behaviour to his hard-working comrades, he was looked up to as a superior; that his blacking became so celebrated that other *décrotteurs* came from great distances to inquire where it could be procured; that they were all referred to Pierre's mother, who soon found that she must give up her toilsome and poorly-paid occupation of going out to wash, for the more agreeable and more profitable one of making and selling blacking; that this blacking became renowned, under the name of *Cirage de Pierre*, and that, in course of time, the widow was obliged to hire premises for carrying on her increasing manufacture; that Pierre grew up to youth and manhood, living with, helping and cherishing his good mother, and employing his leisure evening hours in improving himself by reading useful and interesting works, many of them being elementary treatises upon arts and sciences; and that when the old Galeries de Bois were pulled down, and replaced by the beautiful piazzas, and the Galerie d'Orléans already mentioned, Pierre, who was then about twenty years of age, took one of the compartments destined for a new shop, and had it fitted up in an elegant manner, upon a new and original plan of his own, as a boot and shoe-cleaning establishment, which no doubt exists to the present day.

Pierre did not altogether discontinue his work as a *décrotteur* whilst his shop was being arranged, though he was necessarily absent from the Place du Palais Royal at certain periods of the day, in order to give directions, and see how the workmen were getting on. He was a great favourite with all his customers, and, having informed them of his new speculation, they promised to patronise it. His companions were, more or less, of the same age as himself, and he asked them if they would be willing to take permanent employment under him, at fixed wages, he providing the stock in trade. All answered in the affirmative; but as he did not at first require six assistants, lots were drawn, and three were selected in that way.

In due time the new establishment was completed. Outside, it had the appearance of an elegant shop, with oblong plate-glass windows rounded at the tops, and reaching nearly to the ground; the light metal window-frames were gilt, and the upper part of the door was also made of plate-glass. On entering, you found yourself in a handsome saloon, with a large mirror in a rich gilt frame at either end of it. Running along each side of the saloon were two benches, one above the other, the upper ones being well stuffed and covered with scarlet plush: on the lower banks there were, at intervals of about two feet, iron rods, rising from nearly the edge, in a slanting direction; branching off from the upper part whereof were two iron plates, in the form of the sole of the foot, or boot. The underneath part of the lower benches, faced with red moreen drapery, or valances, served as receptacles for blacking and brushes, when not in use; on elegant tables were sets of excellent clothes brushes, and lying about, on the upper benches or divans, were the daily newspapers and periodicals. Behind a neat counter sate Pierre, unless his customers were so numerous as to require him to assist his *garçons*—his former colleagues as *petits décrotteurs*. They were all obliging, well-conducted young men, habited in neat cloth jackets and trousers, and wearing dark-coloured aprons.

When a customer arrived, he mounted to the upper seat—one step only being required to reach the lower bench—and sat down, placing his feet on the two iron plates, and most likely taking up the nearest newspaper and beginning to read. The first *garçon* who became at leisure, quietly commenced brushing the dirt or dust off the legs of the trousers, then turning them up a little, he began to brush, blacken, and polish his boots or shoes; which operation being finished, the customer descended, by one easy step, to the floor, when the *garçon* brushed his coat and hat for him; the customer paid his moderate fee for all this well and civilly-performed work to Pierre at the *comptoir*, said "*Bon jour*," in all probability, and departed.

The speculation answered perfectly; and the large and celebrated manufactory of *Cirage de Pierre* continued to flourish and increase. Pierre and his *garçons* were a happy community, and the former had the delight of seeing his now aged mother living with him in prosperity and comfort. To sum up all, Pierre was so fortunate as to win the heart and obtain the hand of a most amiable young woman, whose early years had also been passed in the exercise of well-principled industry: she was a good daughter, a good sister, an affectionate friend, and a good wife. Some of Pierre's *garçons* married also, and set up for themselves, by Pierre's advice, in other quarters of Paris, upon the same plan as that of his own establishment. All of them were successful, and every new-year's day they went to see Pierre, and his pleasing wife, and his aged mother, and his children, bringing them little presents, and, what was far more valuable and valued—genuine good wishes and fraternal feelings.

Industry, uprightness, intelligence, and manly

generosity rarely fail of success, if properly directed and crowned with God's blessing; and new channels for the employment of even the most destitute classes of children may be found during the ever-varying phases of modern society. The boys of our ragged-schools, like the *gamins* of Paris, may be snatched from the contamination by which they are surrounded in the miserable corners where they herd together, if the good beginnings which are observable in some districts of the metropolis, and other large cities and towns in the United Kingdom, be generally followed up.

The writer well remembers the old Galeries de Bois in the Palais Royal, and he has witnessed the remarkable improvements which have since taken place in that splendid bazaar. He has, often and often, had his boots blacked and shined, not only by the *petits décrotteurs*, but also by the attentive *garçons* in the new and elegant establishment which he has attempted to describe.

The little shoeblacks of London are now actively pursuing their useful calling: may they all be as well-principled and as successful as Pierre!

A NATURALIST'S GLANCE AT THE ZOOLOGICAL SOCIETY'S FISH HOUSE.

FOURTH PAPER.

STRANGE and beautiful are the sea-anemones, that now force themselves on our attention; and multiform are they in aspect. Some are tenants of the deep, others bespangle the low reefs left uncovered at ebb tide, like flowers painted violet, orange, and azure; others burrow in the sand, either along the expanse of open shore, or in the creeks and gullies amidst craggy offshoots from a precipitous sea-margin.

Those who have been curious, while on a seaside visit, respecting the living "treasures of the deep," cannot but have seen with pleasure these animal-flowers adorning the rocks, which, rising from mimic bays and lakes, have their tiny sierras uncovered at low water. On such reefs, and especially in their nooks and recesses, may be found multitudes of these singular creatures, expanding their azure and orange-tinted arms in the clear and warm sunshine. They adhere by a fleshy stem (having a basal sucker) to the rocks, and from a crowning disc throw out their contractile arms, or tentacles, either in a single row, or in several rows, according to the species. Some species, however, are dwellers in the sand, frequenting low shores and the gullies between rocks. These burrow in sand, and merely rise sufficiently so as to expand their long tentacles, which on the least alarm are contracted, the animal withdrawing itself instantaneously. We have found sand-burrowing anemones of at least two species, at Southhead, and among the rocks opposite the fort at Margate.

The rock species abound near Hastings, and along many parts of the Isle of Wight. We mention these localities, not as being exclusively the haunts of this animal, but as a hint to the visitors to these "watering places" who may chance to read this paper.

In the Actiniæ (sea-anemones), the body or stem is fleshy; often adorned with brilliant colours, surmounted by a disc developing numerous tentacles, placed around a mouth in many rows, like the petals of a double flower: whence their name, *anemones de mer*, or sea-anemones. Though destitute of true feeling, yet they are wonderfully sensitive of light, and expand, or shut themselves up, according as the day is serene or cloudy. When they withdraw their tentacles, the orifice through which these organs pass, contracts, and closes over them like the mouth of a purse. They bear hunger well, but are very voracious, engulfing small crabs, shell-fish, &c., around which their arms or tentacles enfold themselves and force the prey to the mouth. Their tenacity of life is wonderful. They may be cut asunder or divided longitudinally, and in due time each section will become a distinct and perfect animal. One species (*A. Jordaïca*), a native of the Mediterranean, with deep crimson tentacles, is esteemed by the Italians a great delicacy for the table, and in tropical countries many species are used as food.

Among the species in their crystal conservatories around us, we may observe, emerging from the sand, the small leathery sea-anemone (*A. Cariacea*), a tenant of low, flat, sandy shores, and the large leathery sea-anemone, from gullies between reefs (*A. Senilis*), &c. Others are rock-tenants, as the purple sea-anemone (*A. Equina*), with its rainbow hues. But while we look over these and other allied species to be found on our tidal reefs, we cannot withdraw our eyes from some of huge dimensions, with a stem several inches in length, and upwards of three inches in circumference, crowned with a five-lobed flower, each lobe composed above of multitudinous petals. Some of these are snowy white, others orange yellow, not without tints of vermilion, and others of brownish olive. The large white species is doubtless the *Actinia Plumosa* of Cuvier, which he describes as white, with lobes around the mouth, all furnished with innumerable little tentacles; it is the *Hydra Mesebrianthemum* of Gmelix. We may here observe, that the species and varieties of the *Actiniæ* are even as yet by no means well determined; but we may anticipate much information from a collection exhibited to view, under almost natural circumstances, respecting numbers of which we could previously form no exact or perspicuous idea; inasmuch as dredged-up and dying specimens invariably fail, in such beings, to present us with their true characters.

Here and there we see attached to the lower part of the crags an *Actinia*, so obscured by multitudinous long, slender, and wire-like tentacles, as to display no portion of its contracted stem. It is possibly the *Actinia effœta* (see Cuvier), which, as he observes, throws out, when it contracts, a multitude of long filaments from the mouth, which would appear to come from the internal egg-sacs. On the *Actinia* alone, a volume might be written; for it will be observed that we have here abstained both from anatomy and from a crude nomenclature of ill-determined species.

While our eye wanders among these *Actiniæ*, some adhering to stones, others to fragments of glass and bottles, dredged up from the deep, and affording a base for the attachment of luxuriant fronds or enshrouding sea-weed, we observe some-

thing very glittering on the muddy sand below. It is the sea-mouse (*Aphrodita aculeata*), a singular creature, covered with spiny hairs, not unlike those with which the hairy caterpillars of some of our moths are clothed. Hence its specific title of *aculeata*, or spine-clad. Linnæus dedicated it, under the name of *Aphrodita*, to Venus springing from the foam of ocean, in consequence of the surpassing splendour of its iridescent hues. We call it a *sea-mouse*, because it is something like a mouse in size and shape, only that it is more flattened. If we divest it of its spiny covering, we shall find that its upper surface is covered with a double row of membranous plates, overlapping each other; but these are not seen as the back of the animal presents itself. Nothing, in fact, can be made out save an oval-shaped surface covered with an array of stiff hairs, or bristles, brilliant as the plumage of the most effulgent humming-bird, the predominating tints being metallic blue, green, and gold. Cuvier says that its garniture, brilliant in the magnificence of gold, and changing as the tints of Iris, yield neither to that of the humming bird, nor to the blaze of the most precious jewels. He says also that the sea-mouse measures from six to eight inches in length. The largest specimens which we have seen have not exceeded six inches. We speak of some very fine ones, dredged up by ourselves when on board a vessel off the coast of Essex. In the seas of southern Europe it probably attains to a larger size.

But wherefore is this creature (a thing that creeps on the muddy sand, wending its quiet way among beds of oysters, and in the gullies of submarine reefs) so gloriously attired? In its native home it attracts no admiration. It pursues the noiseless tenor of its way, unregarded by its aquatic *confrères*, unless perhaps by those that watch for it as their prey. Wherefore, then, this splendid attire?

> "Full many a gem of purest ray serene,
> The dark unfathom'd caves of ocean bear;
> Full many a flower is born to blush unseen,
> And waste its sweetness in the desert air."

How easy is it to ask a question, and often how difficult is the answer! It is not for man only that the bright things of earth are created, but for the glory of Him whose power, and wisdom, and goodness they themselves reflect, though the eye of human being should never behold them.

Close by the sea-mouse we may observe several contorted calcareous tubes, of considerable length, but, although wider at the top, not much thicker in the middle than a common goose quill. Sometimes we see these tubes intertwined with each other; sometimes convoluted, snake-like, around pebbles or old shells; sometimes detached, yet still serpentine in their form. The animals which secrete and inhabit these tubes are annelides, (a group comprising the sea-mouse, the leech, the earth-worm, the lug-worm, &c.) We might pass them by without notice, were we not attracted by something like a brush, or hair-pencil abruptly cut in half (so as to form a cone or trumpet) protruded from the orifice of this unostentatious tube, the rich colouring of which is a spell to arrest the eye of the most indifferent gazer. The species before us is the *Serpula contortuplicata*; but there is also another species, the *S. vermicularis*. We know of no English names for these submarine creatures; but we may call the first the "many-twisting creeper" and the second the "vermiform or worm-like creeper." From the mouth of the tube these annelides throw out two fan-like plumes of exquisite delicacy and splendour: these are the breathing gills. In the former they are of a fine red varied with orange and violet, in the latter of a rich blue. But besides these they project a sort of filamentous or rather fleshy pencil-like cone or trumpet of intense crimson, passing into purple, terminating in a slender stem. The colour of this trumpet-like pencil varies in intensity, and differs according to the species; but in all, its use is the same. It acts as a stopper to the mouth of the tube, when the animal is withdrawn within it. Its irritability is extreme. A shadow, a jar against the glass, the approximation of an abruptly placed finger, and in goes the stopper, gill-plumes and all, and nothing is to be seen but the simple twisted tube, inert and unattractive. At some point or other we must draw to a close; and having so far conducted our companion through this interesting department, we must now bid him or her adieu. Something, we trust, we have said, not only by way of gratification, but of instruction. But yet, how much remains for analysis! Like him, of whom Milton speaks, we have left half our "story untold." Yet if we have excited attention, or directed an inquiring mind, we shall be well satisfied.

THE DEADLY ART OF WAR.

CONCLUDING PAPER.

In our last we entered upon the consideration of small fire-arms. We now resume that subject, with the remark that no sooner was the bayonet, in its present shape, adapted to the musket, than pikemen altogether disappeared from the infantry of Europe, and the musket became certainly the most efficient manual weapon of war that had ever been brought into requisition for the destruction of mankind. By the expression "bayonet in its present shape," we mean that which is laterally attached to the muzzle of a fire-lock. Originally bayonets were not of this kind; they merely consisted of short daggers, each having a round cylindrical handle capable of being thrust into the musket immediately after the discharge of the latter. The bayonet, we may casually remark, derives its name from the place of its invention, namely, *Bayonne*; in like manner, the term pistol is said to be derived from *Pistoia*, the city where it was first made.

Little need be said about the construction of a common musket. In every respect, save size, roughness of manufacture, and increased weight, it is similar to the old-fashioned single-barrelled fowling-piece; that is to say, it has no chamber, otherwise termed a "patent breech." The ordinary projectile adapted for the common musket, or "brown Bess," as it is familiarly called, is a spherical leaden bullet. In this respect, then, the musket resembles large fire-arms, or artillery, and, except in connection with the rifle principle, soon

to be explained, the spherical form does not admit of being profitably departed from.

We remember well in our early days, when listening to the hair-breadth escapes and encounters of some old soldier, his giving us a most exaggerated statement of the powers of "brown Bess." A musket, we were often told, would kill at the distance of a mile; and so forthwith, in the heat of our imagination, we pictured to ourselves two warlike armies firing at each other with muskets from the two respective crests of a pair of hills distant from each other no less than a mile. Our soldier informant, without telling an untruth, created a false impression. Had he said that a musket ball discharged from its piece would kill at the distance of a mile, *provided it should hit*, the statement might be true; but the fact is that, for all practical purposes, the effective range of a musket is scarcely more than one hundred yards, and by far the greater number of volleys are delivered at distances even less than this. Now a line of infantry, regarded as a target, will resemble very nearly the dimensions of a park paling, and the latter, at a distance of a hundred yards, is so large an object that the reader may think a soldier could hardly fail to hit it. Nevertheless, in practice, scarcely one ball in five would hit the mark, and of all the hits, a large proportion would be merely productive of trivial wounds. Much of this inaccuracy, no doubt, is attributable to the smoke, the confusion, and the excitement of battle; but to some extent it is dependent on imperfections of the musket itself, even where the distance is no greater than one hundred yards.

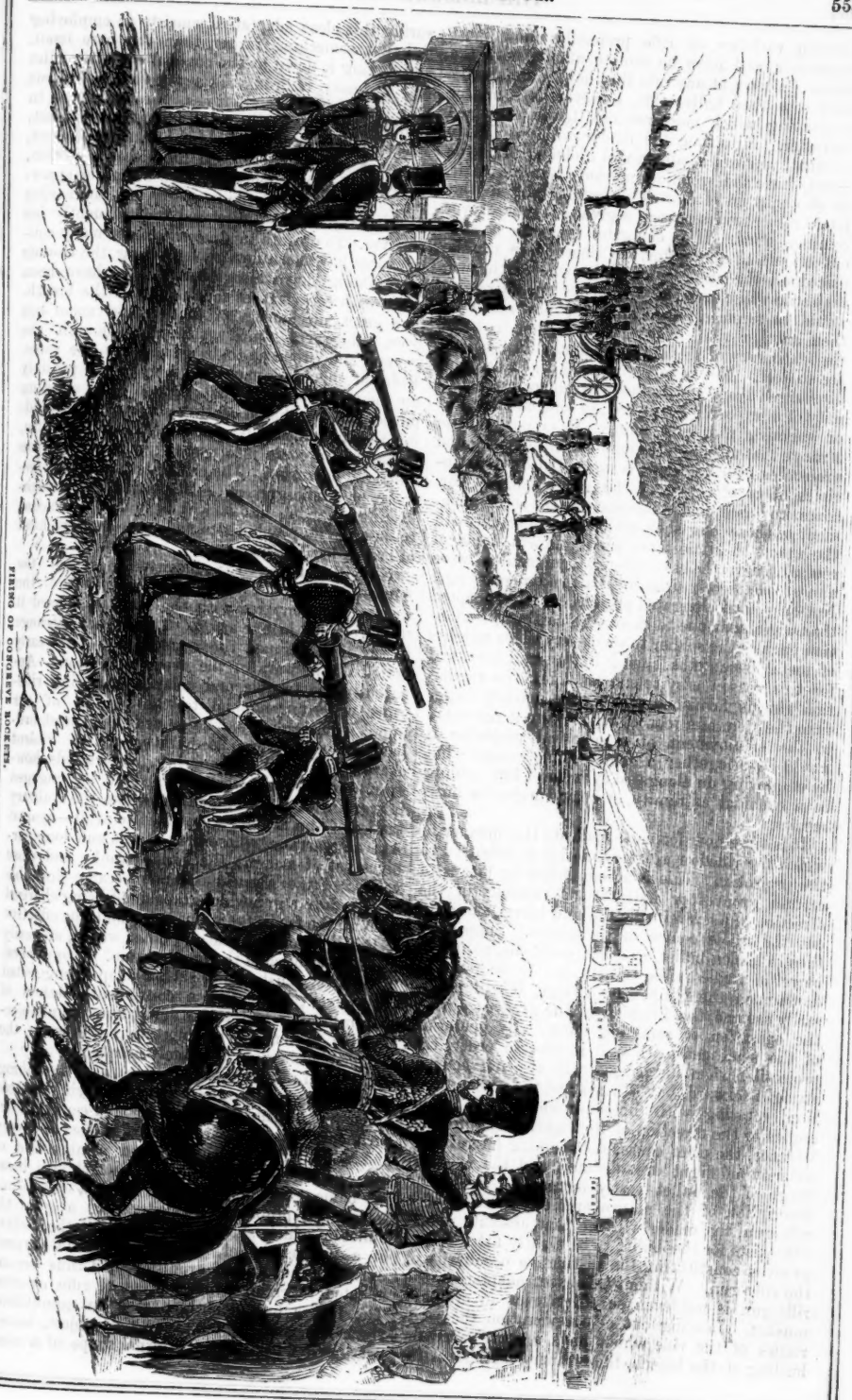
To render this point more clear, let us now assume the musket barrel to be screwed into a vice, accurately pointed at its object, say a hundred yards distant, and fired. Under these circumstances it is obvious that any deflection from the mark aimed at must be alone referable to imperfections in the musket itself. What does the reader imagine the result would be? Why, most probably the exact mark or bull's-eye aimed at would not be hit once out of a hundred times, and the musket balls might strike two feet or even more to the right, to the left, above or below, according to circumstances. Increase the distance to six hundred yards, and the missiles might be found to diverge no less than fifty or sixty yards. Increase the distance to a mile, and the bullet would be still more wildly erratic; it might become deflected many hundreds of yards in any direction.

Now the reader will not fail to understand, from the consideration of what has gone before, that a very large per centage of force possessed by the musket is lost—*thrown away*—in consequence of the devious course pursued by the musket ball. To obviate this tendency to deflection became a desideratum. It was accomplished by the very ingenious modification of small fire-arms termed the *rifle gun*, a description of fire-arms most probably invented by the Germans, but which as a military weapon the citizens of the United States were amongst the first to introduce. The sanguinary, and to us unfortunate result, of the battle of Bunker's Hill, fought in 1775, is said to have been mainly attributable to the extensive employment of rifle guns, by means of which deadly weapons our officers were picked off like so many birds from the branches of a tree, by marksmen far away.

The principles taken advantage of in the construction of a rifle gun will be most readily appreciated after examining the causes of deflection of an ordinary spherical musket ball. What, then, are the theoretical requisites necessary to the correct flight of a spherical musket ball? Firstly, the ball should be accurately spherical; secondly, not only should it be spherical, but it should be also homogeneous: its material should be equally distributed around the centre on every side. Supposing these conditions fulfilled (which, by the by, they never can be)—supposing them fulfilled, we say, still we have another postulate to demand. The spherical ball, more perfect than spherical ball ever can be, must not at its exit from the muzzle of its piece touch on one side more than another; it must, in point of fact, touch all sides alike, and this, our readers will not fail to observe, is another impossibility. Hence, the common musket necessarily remains a very incorrect weapon.

He who would have a true notion of the principle on which a rifle gun is constructed, cannot do better than commence his investigation with the spinning of a top—peg-top, humming-top, or whip-top, it matters not which; any variety of this toy will serve as an illustration of the nature of the rifle gun. Whatever the variety of top used, the player would in vain try to make it stand upright on the spill, whilst remaining perfectly at rest. Once cause the top to revolve, and it stands well enough; but just let the revolutions cease, and after a few unsteady rolls, and spasmodic shakes, down on its side it goes. Now, wherefore is this? In what manner does rotation serve to keep the top upright? The explanation is simply as follows. No top, however accurately turned out of hand, is so correctly made that the weight of its material is equally distributed around the centre. Were such equal distribution carried into effect, and were the top placed exactly upright on its peg, then, theoretically, it should remain upright; but a phenomenon of this kind no one yet has seen. Theoretically, it is possible: practically, impossible; the feat does not admit of being accomplished. The precise manner in which rotation causes the top to remain upright will now, we should imagine, be evident enough. The reader will anticipate our explanation, that rotation practically equalizes the distribution of weight around the central axis. Certain sides of the top in question may, it is true, be heavier than certain other sides, but by virtue of quick rotation, all these inequalities are so intermixed together, that they become equalities; hence the result is as we see it—the top succeeds in standing upright.

Now the great object of a rifle gun is to compensate for any little inequalities possessed by the projectile itself, by imparting to that projectile a rotatory motion during its flight through the air; consequently, if the reader will picture to himself a top, not spinning, peg downwards, on the floor, but cleaving the air, peg foremost, with immense velocity, he will have a tolerably correct idea of a rifle *ball*. Pardon this free use of terms, reader: we know quite well that a top is not shaped like a ball, but rifle balls, as we will still term them by courtesy, are for the most part no balls at all.



FIRING OF CONGREVE ROCKETS.

Certain varieties of rifle projectiles now most commonly used have no remote affinity with the shape of a top; at any rate they have more affinity with tops than balls; this, however, is a matter concerning which more remains to be explained hereafter. Meantime the reader will not fail to see that, whereas a ball—a real globular projectile—may have the spinning motion imparted to it, so also may an elongated projectile; and in this latter respect rifles possess a great advantage over common guns. If an elongated projectile be shot out of one of the latter, no dependence can be placed on the accuracy of flight wherewith such projectile will cleave the air. Now one extremity would be foremost, then another; now one side, then another side, exaggerating a hundred-fold the inaccuracy of flight to which spherical bullets are subject. Not so in the case of the rifle gun, discharged from which the first emerging extremity of a projectile keeps first, so long as the rifled or spinning motion remains. It is not a little strange that although the employment of elongated projectiles for rifled guns is suggested by the principles of construction of the gun itself, as now commonly used, and is necessary to the accomplishment of those long shots which in connection with the name of Minié form such frequent topic of remark, nevertheless spherical projectiles were almost exclusively used until about ten years ago. Not only is an elongated projectile better adapted than a globular one to cleave the air, but its adoption enables the soldier to shoot very heavy weights of metal from guns having but a small bore, and for this reason easy to carry. The Swiss regulation rifle is furnished with a bore scarcely larger than the stem of a tobacco pipe: were it restricted to the employment of a spherical projectile it would be altogether a contemptible weapon; but by employing an elongated cylinder of lead, ending in a conoidal extremity, a heavy projectile mass results.

It is time now for us to indicate the manner in which the rifled or rotatory motion is imparted to the projectile. This is accomplished by means of certain grooves or indentations running in the direction of a screw inside the gun barrel, throughout the whole course of its length. Supposing, then, a leaden bullet, or other projectile, to fit the barrel of a rifled piece tightly, and to be rammed down upon the gunpowder charge, it will necessarily assume the direction of the grooves during the operation of ramming down. By operation of the same cause, though in reverse order, the projectile, when discharged, will also not emerge straight forward, but will assume the screw direction, rotating with immense velocity at right angles to the direction of its flight. By this contrivance, the chief causes determining lateral irregularity of flight are obviated, and the effective range of the bullet vastly increased. From our description of the nature and construction of a rifle-gun, the reader will see that absolute necessity exists for the bullet to be tightly fitted to the grooves constituting the distinctive peculiarity of the rifle-gun. Without this exact adaptation, the rifle-gun is not even so effective as an ordinary musket. Leaving out of consideration those varieties of the rifle which have a contrivance for loading at the breech, the ordinary method of insuring this close adaptation consists in employing a bullet something larger than the bore itself, and forcing it down by the conjoint aid of a mallet and a heavy ramrod. This process, so tedious and inconvenient at all times, is especially so in military practice. The military rifleman must, whenever he can, lie hid behind banks, brushwood, or other natural cover, load his piece by stealth, unnoticed by the enemy, and fire whenever opportunity presents; but the necessity for hammering down a tight bullet disclosed too frequently his position. To obviate this inconvenience many contrivances have been devised for saving the trouble of ramming down altogether. Rifles have been made with contrivances for loading at the breech. The exact mechanism of these contrivances has been subject to much variation, although the general end proposed to be gained was the same. Rifles of this kind may have been in use possibly for the purpose of deer-stalking and other sporting purposes more than a century; but notwithstanding the theoretical advantages of this kind of arm, it has never come into use as a military weapon amongst ourselves. The celebrated *zündnadelgewehr*, or needle-gun, of the Prussians, is a breech-loading weapon; but it will be more convenient to describe its peculiarities under the general head of breech-loading fire-arms.

Notwithstanding the inconveniences of the mouth-loading rifle, the superior accuracy of the weapon, as compared with the musket, caused it to be retained in our army. The French, strange to say, discontinued the weapon at a very early period of the wars of the great revolution. Apparently the trouble and delay of charging rifle-guns were uncongenial to the temper of our impulsive neighbours, who gained their most brilliant military triumphs by a series of violent charges and rapid manœuvring. Afterwards, however, the French were destined to be engaged in warfare with a race against whom the military tactics of the Empire were of little avail—against African warriors, whose fleet steeds and long carbines set at nought the serried ranks and close volleys of the French. It now became desirable to introduce a gun which, capable of being charged with all the facility of a musket, should be effective at the distance of a rifle; in other words, an easily loaded rifle became the desideratum. Two general methods of constructing such a weapon suggested themselves; either some convenient method of mouth-loading had to be devised, or an unobjectionable system of loading at the breech: the former plan became ultimately adopted.

We shall not trouble the reader with describing the various modifications which the rifle system underwent during the progress of a course of experiments ultimately resulting in the discovery and adoption of that celebrated combination of gun and bullet by captain Minié, which still bears his name. Suffice it here to remark, that Minié solved the problem of constructing a gun, the bullet of which should enter with all the facility of a musket bullet, but which should expand during the course of expulsion, and thus become adapted to receive the impress of rifle grooves. The reader has, doubtless, seen an unmutilated sugar-loaf, and he will, from that object, have a very correct idea of the external shape of a minié

bullet. In the base, however, of the minié-bullet resides its great peculiarity. Having already compared a minié projectile to a sugar-loaf in appearance, let the reader now imagine it hollow instead of solid—a conical excavation similar in shape to the external contour of the loaf being cut away from within; he will then have a still more correct idea of the minié-bullet. But this is not yet all; into the central cavity is slightly fixed a sort of iron thimble, something larger than the cavity itself, and which, therefore, can only be driven up into this cavity, so that the edges of each are on the same plane, by expanding or forcing out the leaden sides of the bullet.

Matters being arranged as we have described, it follows that a minié-bullet, lying base downwards on its charge of powder, will receive the first impulsive blast of that powder, when inflamed, in its iron thimble. The thimble, in point of fact, receives an impulse before the bullet itself, and being thus driven up into the bullet, expands the walls of the latter, and renders it amenable to the rifle principle. Thus modified, the rifle becomes quite as easy to charge as the ordinary musket, whilst the ranges accomplished are so great that, according to the opinion of many competent authorities, small arms will in future possess an advantage over artillery in the field. The effective range of the minié-rifle is very great; at six or seven hundred yards, a target equal to a man in size could scarcely escape being hit, supposing the rifleman to be no more dexterous than ordinary. At a distance of a thousand or twelve hundred yards, the body of men and horses attendant upon a single piece of artillery could scarcely fail to be hit; and, at distances considerably more remote, the minié-rifle would still prove effective against large masses of men.

Now, in order fully to appreciate the increased powers conferred on infantry by the use of this weapon, it is necessary to pass in review the functions and powers of artillery. We have already seen that deadly as are the effects of cannon round shot, yet it is by showers of grape, and canister, and shrapnell-shell, that death gathers his richest harvest. If, therefore, infantry, by means of long-shooting rifles, can succeed in striking down men or horses of an artillery retinue before the latter can approach near enough to use the projectiles in question, then to a corresponding extent does it follow that the powers of infantry will be increased, and those of artillery diminished. To some extent this has been accomplished by the minié-rifle. The most effective distance for grape and canister-shot is about three or four hundred yards, and even then the fire is only effective against dense masses of individuals. Now the minié rifleman, it is said, may lie ensconced in some hole or corner, and deliberately strike down, by successive discharges of his murderous arm, the men and horses of an approaching piece of artillery. If this speculation be borne out, it follows that shrapnell-shell or spherical case-shot will be the only effective kind of ball-scattering missile remaining; and this indeed is the assertion of more than one competent military authority.

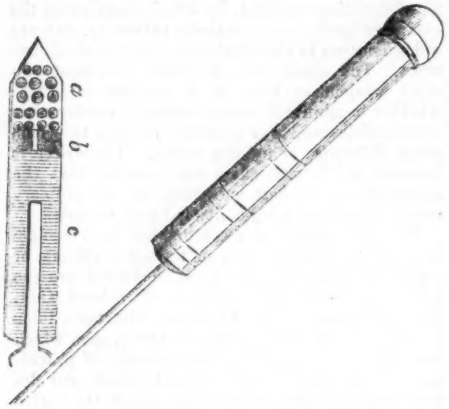
The Prussian needle-gun, or zündnadelgewehr, is an exceedingly curious breech-loading instrument. It can be charged and discharged with far greater rapidity than the minié-rifle, and probably the flight of its bullet is somewhat more correct than the latter, but its formation is more complex, and more easily disarranged; moreover, if report be true, the needle-gun after little use leaks fire to such an extent that a soldier can no longer discharge it from his shoulder because of the blast of fire issuing from the metal junctures. The appellation *needle-gun* has reference to the method of discharging the piece, which is as follows. The needle-gun is charged by means of a cartridge containing bullet powder and detonating material, the last being situated immediately in front of the gunpowder, between it and the bullet. To effect the discharge, a thin steel needle is violently projected quite through the cartridge, and against the detonating material, by which contrivance the cartridge ignites at its anterior extremity, hitherto a desideratum in the discharge of all kind of fire-arms. The needle-gun, doubtless, is a most efficient weapon so long as it remains in order: whether it admits of being retained in order after considerable use, is a question relative to which much difference of opinion exists. The writer is inclined to side with those who consider that the minié-rifle is the best substitute for the ordinary musket that man's ingenuity is likely to devise.

The last quarter of a century has been prolific in a variety of small firearms termed revolvers, or repeaters. Of these, the most celebrated are the revolving pistols and carbines of colonel Colt. This gentleman is an American, who turned his attention to the construction of the weapon which bears his name, urged by the necessity of providing some means of more efficient attack and defence than had hitherto existed against the native Indians, who, if they could once succeed in tempting a soldier to discharge his fire-arm, rushed upon him and killed him long before the process of reloading could be executed. We have not space to enter upon a more full description of the repeating fire-arms of colonel Colt, or to point out the minute differences between his weapons and those of other inventors. Messrs. Witton and Daw, of London, are believed to have devised a modification of a revolving pistol capable of being discharged with still greater rapidity than that of Colt.

We must now take leave altogether of small fire-arms, trusting that their employment for man's destruction will cease no less abruptly than our description. Another weapon of fire awaits our explanation; and, inasmuch as it is the last, the reader, we are sure, will permit us to describe it. The weapon in question is the war-rocket, more generally known as the *congreve-rocket*, after sir William Congreve, who, if he did not discover this weapon, as some people have erroneously supposed, first introduced it as an agent in British warfare.

If the reader has ever seen a common sky-rocket, he may be told that a war or congreve-rocket is nothing more than a sky-rocket, having an iron instead of a paper case. This description would indeed not be quite correct; but it would be so very nearly correct, that we need not stay to discuss peculiarities just at this time, being content to take them up hereafter. Instead of pointing out the constructive peculiarities of a rocket, we will direct the reader's attention to the *prin-*

ciple on which it depends. We will select the first point of divergence between the rocket and the gun. In either case gunpowder is the agent of force, but the difference between the results in the two weapons is this. Applied to a gun, the powder serves to propel a ball or other missile; whereas, applied to a rocket, it is the rocket which takes flight. Getting rid of all our preconceived notions concerning the shape of guns—regarding them as so many hollow tubes, open at one end, closed at the other, except the touch-hole aperture for igniting the charge—remembering only that every gun when discharged recoils—then our expression will be intelligible when we affirm that a rocket is nothing more than a continually recoiling gun.



SKY-ROCKET AND CONGREVE-ROCKET.

The external aspect of a rocket will not suffice to impart a correct notion of its interior; we therefore append the section of a common sky-rocket. *C* in our diagram represents the body of the rocket—*rocket proper*, as we may term it—separated from the head of the rocket *a*, by the interposition of a non-combustive layer *b*, through the centre of which a little hole is perforated. To the body *c* we wish to draw the reader's attention. He will observe, that a conoidal aperture exists up the centre of the composition wherewith the body of the rocket is packed. The *rationale* of this excavation is as follows. Were it not there, the rocket composition would not burn with the velocity requisite to impart the necessary recoil; in other words, it would not burn over a sufficient area at any one time. Usually, this central excavation is made during the packing of the rocket, though, occasionally, the rocket is packed solid, and the conoidal aperture subsequently excavated; the principle, however, is all with which we have to concern ourselves. The interposed material *b* may be of clay, and its function as a mere partition has been adverted to already. The chamber *a*, in an ordinary sky-rocket, is filled with stars or other ornamental fire-works, which are ultimately dispersed by a small charge of powder lying in the crevices between them, and ignited through the central aperture or touch-hole existing in the partition *b*.

Now it is not difficult to understand that the chamber of ornamental fireworks might have been a repertory of gunpowder surrounded by iron walls, or a mixture of gunpowder and bullets, or a lump of carcass composition; all these resources being brought into application by manufacturers of congreve-rockets.

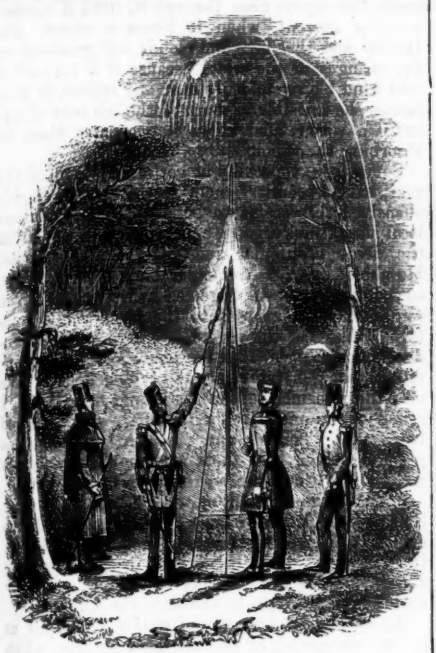
So far as relates to the packing of a rocket, the reader will now, it is presumed, have a very adequate notion; but there is a most important appendage to be described, without which a rocket, however well packed, would not fly straight. We allude to the stick, or tail.

The common sky-rocket had long been a projectile weapon of war in the east before any person thought of introducing it to our service. About the year 1805, however, sir William Congreve began a series of experiments with this object in view. His first attention was directed to the paper case, which he got rid of altogether, using sheet iron instead. Thus altered, the sky-rocket became the early war-rocket of Congreve, and did considerable service; nevertheless, experience demonstrated the advantage of doing away with the lateral guide-stick; hence congreve-rockets were soon manufactured in accordance with the new discovery; the stick being attached to the centre instead of the side of a rocket, thus imparting to the weapon the straightness of an arrow, and enabling it to be shot with advantage out of tubes. This modified attachment of the stick necessarily required a new contrivance for permitting the escape of flame. That escape could no longer be central, inasmuch as the stick filled the position in question; it was accomplished, therefore, through a series of peripheral apertures.

Several attempts have been made at different times to regulate the flight of rockets without the necessity of attaching to each a stick. All Congreve's endeavours in this direction were fruitless; but Mr. Hale apparently has been more successful. He has overcome the difficulty by taking advantage of the rifle principle, which has achieved so much in rectifying the flight of small-arm missiles. The rifled rocket, however, has not the specific motion imparted to it by a gun, but by a peculiar arrangement of the fire jets themselves.

The war-rocket, doubtless, is a very terrible weapon, but the sphere of its application is not so extended as Congreve himself imagined would have been the case. Like most inventors, this gentleman entertained very exaggerated hopes of his pet weapon. He thought cannons of all sorts would go out of use, superseded by the rocket, and the arguments he adduced in favour of this opinion were apparently valid. Now we may safely grant every advantage that Congreve anticipated, with one little proviso—*that the war-rocket can be made to fly with precision equal to that of other missiles.* At present this is so far from the truth, that war-rockets are more devious in their flight than any other fire missile whatever. It is especially difficult to fire them with any degree of precision across or against a wind, and even when the day is calm they sometimes play most objectionable pranks. Some years ago there was a demonstration of congreve-rockets at Woolwich, got up for the purpose of showing the celebrated marshal Soult what our war-rockets could do; and one of these fiery messengers did indeed perform a most

extraordinary feat; instead of proceeding at once in the direction of the target against which it had

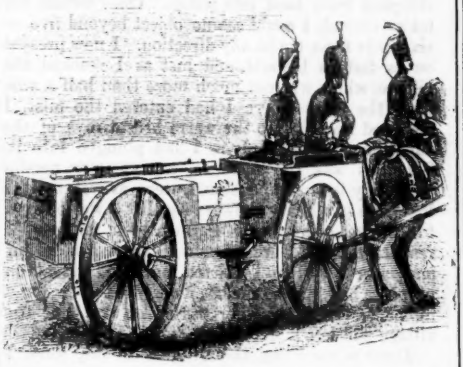


SIGNAL-ROCKET FIRED IN A WOOD.

been fired, it mounted up into the air, abruptly turned back, and plunged into the ground at a point very near to the place where the marshal was standing! A similar freak, performed by a whole flight of war-rockets, prejudiced the duke of Wellington against them from the first. It was during one of our Peninsular campaigns that some of the new missiles were forwarded to the duke, who one day determined on trying their effect against the enemy. The congreves behaved very ill on that occasion; they fairly turned their tails to the enemy, and came hissing back amongst their friends. Notwithstanding these irregularities, congreve-rockets have done service in war. The first occasion of our employing them on land was at the celebrated battle of Leipsic. The enemy could not tell what to make of them at all. The devastation they committed was frightful. Entire ranks were mowed down, and surprise at the novelty of the weapon magnified the effects even beyond the dimensions of truth. On this celebrated occasion, a whole company of the enemy, thinking it unavailing to struggle against a weapon so terrible and so strange, to a man laid down their arms!

It remains for us only now to say that war-rockets are either projected from tubes, or allowed to take flight along the ground. Congreve suggested the simultaneous discharge of whole volleys from a series of tubes attached to a carriage. This plan, however, is not adopted at the present time.

Thus concludes our sketch of the implements employed in the deadly art of war. Engines of destruction as they are, it is painful for a humane mind to contemplate their structure, and to remember the misery which it is their express func-



ROCKET CARRIAGE.

tion to create. We leave, therefore, the description which we have given, to be meditated on by the thoughtful reader. No humane mind can wish the modern Moloch to have his hecatombs of human sacrifices offered up to him, attended by the wails of the widow and the orphan. But, alas, the cure of the evil is difficult to suggest, and he is the best patriot who fervently solicits God to remove the scourge of war from our land.*

SEA-SIDE PHENOMENA.

Among other objects of interest which we meet with by the sea are several curious meteoric appearances, only to be observed in the neighbourhood of large bodies of water, of which that singular phenomenon, a sea-fog, is one. The first time that one of these fogs came under my notice was soon after taking up my residence on the south-western coast of England. One radiant afternoon, early in July, I had been greatly enjoying a rambling expedition on the hills and was returning home, when, on rounding a corner which brought me within sight of the road contiguous to my house, I was surprised to see that it was wholly enveloped in a dense cloud of fog. There was no other way to my home except through the midst of it, unless I retraced my steps, and pursued one that would have taken me more than twice the distance, which, from my fatigue, I could not think of doing; although, on the other hand, having but just recovered from an attack of fever, I shrunk from encountering the chilling moisture of a foggy atmosphere. Long did I sit on my donkey in the bright sunlight, contemplating the line of fog which I was about to enter, and anxiously considering whether by any means it was possible to avoid it. There seemed, however, no escape; and so, screwing my "courage to the sticking place," I made my guide take the donkey by the bridle, and trotting him on as fast as he

* The large engravings which appeared in the two preceding numbers of this journal, representing the firing of a 68-pounder from a casemate, and a mortar battery, are copied, by the courteous permission of Mr. Ackermann, from an admirable series of tinted lithograph drawings illustrative of the evolutions of the Royal Artillery.

would go, dashed at once into the dense vapoury curtain. The transition was really almost like stepping from land into water. Once within the misty shroud, I could see no object beyond five or six yards from me in any direction. I now pressed on as fast as I could, and just as I reached the village, which was not much more than half a mile from the point where I had entered the mist, I emerged from it into the warm bright rays of the sun, almost as suddenly as I had plunged into it. Short as was the distance, my summer muslin dress, my bonnet and shawl, were as wet as if I had been in a heavy shower; so that I was obliged to change every outer garment the moment I reached home. Here I found all around me as fair and clear as when I started, nor, as I learnt on inquiry, had the scene been obscured even for a moment, the fog having passed on one side the village and left it untouched.

These phenomena, though new to me, were, I found, not uncommon on this coast. I have since seen the sea-fogs, as they are called, stalking over sea and land: sometimes like a lofty pillar, rising from the water and losing itself in the clouds; at others of less regular form, and more like a floating cloud scudding along. I have remarked it from an eminence, where I have stood in full sunshine, passing over the sea, ensbrouding first one little vessel and then another, and then leave the sea and pass over cliff, and hill, and vale, covering whatever happened to be in its way with gloom and discomfort, whilst all on either side reposed in the smiling sunlight. I have watched it as it has come towards me, and seen it diverge and pass by across fields at a short distance from me, while I have altogether escaped its touch. I was once, also, with a party on the water when one of these travelling vapours came upon us, and, rapidly passing, merely left us slightly damp and chilled, and rejoicing that its visit was so short, and that the warm sunshine was once more ours.

But the question occurs to the philosophic mind, what are these fogs, of what are they composed, and why do they thus traverse sea and land with such giant strides? Clouds and fogs, as is generally known, are, simply speaking, the same things, composed of the same elements, arising from the same causes and subject to the same laws; the only real difference between them seems to be in *position*, clouds being in all cases more or less elevated above the earth, whilst fogs rest on its surface. Both are formed by the ascending of the invisible vapours from the surface of the earth, and are composed of thin vesicles of water containing air, which rise readily, because, being lighter than air, they float in it, on the same principle that soap bubbles inflated with hydrogen gas would float. How these vesicles are formed is not well understood, but the general opinion is that mists and fogs arise from air of unequal temperatures, holding moisture in solution, mingling together. Dense mists often arise from the mixing of the evening sea-breeze with the air above the land, because the air above the sea is warmer than that above land, and consequently when they mix the aqueous vapour condenses and forms fog. The reason why these vapours in some cases produce cloud, and in others fog and mist, is, that when the surface of the earth is warmer than the air, the vapour being chilled by the cold air condenses at once and becomes fog; but when the air is warmer than the earth, the vapour rises through it, until it reaches a colder current, when it forms a *cloud*. Dr. Brewer says that fogs and clouds are produced by the changes of the wind, because if a current or cold wind blows suddenly over any region, it condenses the invisible vapours of the air into cloud; but if a warm wind blows it dissipates them by absorbing the vapour.

Some fogs, especially at certain seasons of the year, have a peculiar smell, in many cases highly offensive; this seems to be caused by deleterious local admixtures arising, among other causes, from the decay of animal and vegetable substances. Humboldt says: "Ammoniacal and other vapours, containing azote, sulphuretted hydrogen, and even combinations analogous to the ternary and quaternary bases of the vegetable kingdom, may produce miasma, which under many forms and conditions may generate agues and typhus fever." We often hear seamen talk of "stinking fogs;" and I remember on one occasion a sea-fog, which seemed laden with offensive and mephitic vapour to so great a degree that those whose olfactory nerves were at all delicate were greatly distressed by it.

Such is the general nature of fogs; but why those of which I have been speaking should be so arbitrary in their movements, and so limited in their range, it would be difficult to say; nor have I been able to meet, in my researches, with any author who attempts to elucidate the subject.

Another subject worthy of notice is afforded us in the alternation of sea and land breezes, which succeed each other with such wonderful regularity. The former sets in at about seven or eight o'clock in the morning and continues to increase till noon, when it gradually subsides. At about six, the land breeze commences, and continues to blow from the land towards the sea till about eight the next morning; the sea at this time displaying a greenish hue. The reason of this alternation is that, during the day, the air over the land is more heated by the rays of the sun than that over the sea; because the earth, from its greater density, variations in its elevations, and other causes, reflects the sun's rays sooner and more powerfully than they are reflected from the sea, which, from its continued motion and transparency, imbibes the rays which fall on it more slowly, though more surely. Accordingly, when the morning sun has imparted a sufficient degree of heat to rarefy the body of air over the *land*, the air so rarefied ascends into the higher regions of the atmosphere; whilst that above the *sea*, being at present scarcely at all rarefied, rushes in to supply its place, and thus produces a current of air from the sea to the land: but, when the sun sets, the body of air which is over the *land* cools suddenly, and the earth by radiation parts quickly with the heat it had absorbed; then the air over the land, being below the temperature of that above the sea, the former rushes in to supply the place of the latter, by which means, during the night, a current of air from the land to the sea is produced. Hence it is that the sea-shore is considered healthy during the day, but otherwise in the evening; since the sea-breeze, in passing over so great a body of water where there are no impurities to mix with it, is of

a more pure and bracing nature than that which sweeps over the land, collecting in its progress the deleterious gases arising from the decay of animal and vegetable substances.

One more interesting phenomenon must be referred to before I conclude, and that is the occasional appearance of prismatic colours on the spray of the sea. After a most stormy day, on one occasion, in the month of September, the sea under the influence of a strong south-west wind had lashed the coast in fury, "mounting to the welkin's height." It had been a wild and grand scene, but as the day wore on the wind lulled, the sheets of rain that had poured from the densely-clouded sky abated, and after a few hours the sun broke out with extraordinary brilliancy. Being at that time rarely daunted by the fear of weather, I sallied forth between five and six o'clock for a stroll before tea, and bent my steps to that point of the steep shingle beach which lay between some massive red sandstone cliffs towards the west. Here I wandered for a considerable time, much delighted by watching the waves as they broke on the shore, and observing the multitude of gulls, cormorants, divers, and other sea-birds, as they wheeled about in the air, alternately dropping on the crest of a wave and floating on the surface of the ocean, which was still tossed and troubled as it always is after a storm, or diving below in search of their prey. I lingered thus until the sun was getting low, when I thought it better to turn homewards; it was then that I had the privilege to behold a sight which, much as I have been in the habit of walking on the sea-shore, I had never before witnessed. The waves were still running very high, and from the force with which they broke on the rough pebbles, sent up beautiful crests of foamy spray, which glittered in the evening sunlight. But they did more than glitter, for over each wave, as I passed, hung an exquisite arch of prismatic colour like a rainbow! It was but a momentary display, for I could scarcely utter an exclamation of delighted surprise at its beauty before it was gone, but gone only to be repeated on the next wave which broke.

> "Glittering with light, each drop of spray,
> Which formed that foamy diadem,
> A jewel seemed; then fell away
> Back to the ocean whence it came;
> Yet ever, from that ceaseless tide,
> Another gem its place supplied."

So it was, and a succession of these most beautiful prismatic effects was presented to me as I pursued my way along the beach, till after a few minutes the sun sunk below the elevation requisite to produce the refraction, and the exhibition altogether ceased; nor did I ever, at any subsequent period of my residence on the coast, perceive anything of the same kind.

The causes of this phenomenon are easily explained. Light, as is generally known, is composed of several rays, each of a different colour. When these rays are united they form a white or rather colourless illumination, but by passing through some substances, under some peculiarities of form, these rays separate, and each being divided from the others, shows its own distinct and individual tint. We see this fact exemplified in the rainbow, the cause of which sir David Brewster thus explains:—"As the rainbow is never seen except when rain is actually falling between the spectator and the sky opposite to the sun, we are led to believe that the transparent bodies required are drops of rain, which we know to be small spheres. If we look into a globe of glass, or water, held above the head, and opposite to the sun, we shall actually see a prismatic spectrum reflected from the further side of the globe. In this spectrum the violet rays will be innermost, and the spectrum vertical. If we hold the globe horizontally on a level with the eye, so as to see the sun's light reflected in a horizontal plane, we shall see a horizontal spectrum, with the violet rays innermost. In like manner, if we hold a globe in a position intermediate between these two, so as to see the sun's light reflected in a plane inclined 45° to the horizon, we shall perceive a spectrum inclined 45° to the horizon with the violet innermost. Now, since in a shower of rain there are drops in all positions relative to the eye, the eye will perceive spectra inclined at all angles to the horizon, so that, when combined, they will form the large circular spectrum which constitutes the rainbow."

Now this same theory will equally explain the beautiful effect of which I have been speaking; as, of course, each minute particle of water which forms the spray arising from the rebound of a broken wave, being spherical, will act as a prism, and divide the rays of light which fall on it in the same manner as the raindrop does; and a person placed suitably, with regard to both the sun and the spray, will discern prismatic colours precisely in the same manner, only on a smaller scale, as one placed suitably with regard to the sun and a shower of rain would discern them.

Those who saw the glass light-house exhibited in the first Crystal Palace will probably remember to have noticed the beautiful effect which resulted from every piece of the glass being a prism, and thus dividing the rays; so that, from whatever point they looked at it, the exquisite gleams of prismatic colouring were still to be seen, shifting and changing as they moved, yet never wholly absent.

I have selected these few among the phenomena of which I have spoken, because they were all somewhat of meteoric effect; but there are very many more which might be adduced as giving interest and charm to a sea-side life, in meteorology, botany, zoology, etc.; space, however, will not allow me to enter further on the subject.

THINGS TO BE REMEMBERED.

Those who trust to any rock but God, will find it sand in the day of their distress: it will fail them when they most need it.

Friends are soon lost: but God is a friend from whose love neither the height of prosperity, nor the depth of adversity, shall ever separate us.

Children often fare the better for the piety of their ancestors in this world, even though they may be themselves degenerate.

Early piety will be the greatest honour of young people, and bring them as much as any thing, and as soon, into reputation.

God will not fail, some way or other, to guide those by his counsel that are sincerely desirous to know their duty, and apply themselves to him to teach them.

Varieties.

THE CUNNING THRUSH.—There is much more intellect in birds than people generally suppose. An instance of this occurred the other day at a slate quarry belonging to a friend of the writer. A thrush, not aware of the expansive properties of gunpowder, thought proper to build her nest on the ridge of the quarry, in the very centre of which they were constantly blasting the rock. At first she was very much discomposed by the fragments flying in all directions, but still she would not quit her chosen locality. She soon observed that a bell rang whenever a train was about to be fired, and that, at the notice, the workmen retired to a safe position. In a few days, when she heard the bell, she quitted her exposed situation, and flew down to where the workmen sheltered themselves, dropping close at their feet. There she would remain until the explosion had taken place, and then return to her nest. The workmen observed this, narrated it to their employers, and it was also told to visitors who came to view the quarry. The visitors naturally expressed a wish to witness so curious a specimen of intellect; but as the rock could not always be blasted when visitors came, the bell was rung instead, and for a few times answered the same purpose. The thrush flew down close to where they stood, but she soon perceived that she was trifled with, and it interfered with the process of incubation; the consequence was that afterwards, when the bell was rung, she would peep over the ledge to ascertain if the workmen did retreat, and if they did not she would remain where she was.

RIPENING HOLLYHOCK SEED.—At the great hollyhock and carnation show which took place at Glasgow, in August last, twelve magnificent spikes of hollyhocks were exhibited by the Messrs. Paul, of Cheshunt. Of these, when the show was over, I had nine spikes, which were immediately put in water, and placed on a table, so as to continue the gratification of viewing them as long as they would remain fresh. After ten days, however, they began to assume the sere and yellow leaf, and hence they were removed, and laid on a heap of cut short grass, in which there was a considerable heat. I did not think more of them until a few days afterwards, when, passing the heap, I observed seed pods forming on them; I then removed them, cut a small portion of the lower end off each spike, and placed them in wet sand under glass, for about four weeks, when I considered the seed to have been ripened; I then took them out of the sand, and laid them carefully aside to dry for a few days; I afterwards removed the seed pods from the stems, and kept them till the middle of April last, when I sowed the seeds on a hotbed under glass, and have now the satisfaction of seeing upwards of sixty fine healthy young plants, the produce of my friend's noble flowers, which so deservedly carried off the first prize at the exhibition alluded to.—*J. N in Gardener's Chronicle.*

THIEVES OF THE NEW HATS.—An elegantly dressed gentleman ordered, some time ago, at a Parisian hatter's, twenty-five hats of an entirely new form. The maker, when they were finished, tried one on, and finding that it became him, made a twenty-sixth for his own personal use. The individual who had given the order called punctually for them, and paid cheerfully. The next Sunday, the hatter gave his new head-piece an airing in the Champs Elysées. When at the Road Point, he observed several persons adorned with the coverings he had made. One came up to him, and said, with a peculiar wink, "A good day for booty this, and no police about!" Well, thought the hatter, I should not wonder if I had been making hats to serve as a rallying signal to members of a secret society. Rather concerned, he kept on his walk. Under the Arch of Triumph he saw other individuals sporting other specimens of his last new style. One came quickly behind him, and said, "Here, put these in your pocket; and these, and these." He handed him three watches with broken chains, two purses, and five handkerchiefs. The hatter now saw clearly enough the sort of society with which he was in league. He "peached" to the nearest commissary of police, and the twenty-five pickpockets were speedily lodged in jail.—*Paris Correspondent of the New York Times.*

A HUMAN PINCUSHION.—Kitty Hudson, whom many still remember as the Arnold Post, was born at that village in 1765, and when six years of age was left with her grandfather, Mr. White, the sexton of St. Mary's, Nottingham. Here a young woman resided in the capacity of a servant, who used to reward Kitty with a stick of toffy for every "mouthful" of pins she procured in sweeping the pews and aisles of the church. The poor child followed this practice till she could neither eat, drink, nor sleep without pins or needles in her mouth. Often she got out of bed to supply herself with them, that she might induce sleep. To such an extent did she carry this strange practice that ere it was discovered by her friends, her double teeth had almost disappeared. At length she began to perceive a constant numbness in her limbs, and a great inability to sleep. After various medical applications, she was removed to the general hospital. Between the time of her admission and June 12, 1785, when she was finally "dismissed cured," she underwent a most astonishing series of operations. Great numbers of pins, and needles, and pieces of carious bone were extracted from her feet, legs, arms, and other parts of her body, while both her breasts were removed with the knife. While in the infirmary a young man named Goddard, who "had sweet-hearted her from a child," happened to be an out-patient for a complaint in his head, through which he lost an eye. He used to cheer her by saying he would marry her if she lost all her limbs, provided her life was spared; and she afterwards said it was the kindness of this young man, and her attachment to him, which enabled her to bear up under her protracted sufferings. Six months after her discharge from the infirmary, she was married to the faithful Goddard, to whom she bore nineteen children. It is supposed she died in Derbyshire, whither she went on her husband's death.—*W. H. Wylie's "Old and New Nottingham."*

THAT IS A BOY I CAN TRUST.—"I once visited," says a gentleman, "a large public school. At recess a little fellow came up and spoke to the master; and as he turned to go down the platform, the master said, '*That is a boy I can trust.* He *never* failed me.' I followed him with my eye, and looked at him when he took his seat after recess. He had a fine, open, manly face. I thought a good deal about the master's remark. What a character had that little boy earned! He had already got what would be worth to him more than a fortune. It would be a passport to the best office in the city, and what is better, to the confidence of the whole community. I wonder if the boys know how soon they are *rated* by older people. Every boy in the neighbourhood is known, and opinions formed of him; he has a character, either favourable or unfavourable. A boy of whom the master can say, 'I can trust him; he *never* failed me,' will never want employment. The fidelity, promptness, and industry which he has shown at school are prized everywhere. He who is faithless in little shall be faithless in much."

SUBMARINE TELEGRAPH TO AFRICA.—It has lately been announced in one of the leading French papers, that an important project, which has excited the interest of the French government, is about to be realised. It is stated that, after a serious study of the matter, a convention, in which the different powers interested have taken part, has been concluded for the establishment of an electrical communication which will unite the European continent with Algeria by crossing the islands of Corsica and Sardinia. The submarine telegraph which comes from England to France is to be continued by land, and after crossing Nice and Genoa, will reach Spezzia, at the bottom of the gulf of that name. The new line will start from that point, and after crossing the island of Corsica will pass by Sardinia to the coast of Algeria, near Bona. From that place, if it be thought necessary, it will be continued as far as the Regency of Tunis. The works necessary for the accomplishment of the first part of this plan will be completed in two years from the date of the promulgation of the law. At that time the line will be prolonged by the shore of the Mediterranean in Africa as far as Alexandria, in order from that point to reach India and Australia.